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**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION**

_____)	
ORACLE AMERICA, INC.)	
)	
Plaintiff,)	
)	
v.)	Case No. CV-03561-WHA
)	
GOOGLE, INC.)	
)	
Defendant.)	
_____)	

**PROFESSOR JAMES R. KEARL, RULE 706 EXPERT,
RESPONSE TO MOTIONS IN LIMINE AND DAUBERT CHALLENGES**

April 6, 2016

Subject to Protective Order – Highly Confidential

Attorney's Eyes Only

Expert Report of Professor James R. Kearl, Rule 706 Expert
Response to Motions in Limine and Daubert Challenges   April 6, 2016

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I.   Assignment

In accordance with paragraph 7 of the Court's Order dated December 9, 2015, ECF Doc. #1395, Dr. Kearl, as the Court's Rule 706 expert, files the present response to the Daubert motions of Oracle and Google regarding Dr. Gregory Leonard and Mr. James Malackowski, which were filed on March 23, 2016.[1]

Google also filed Motions in Limine against certain opinions of Professor Adam Jaffe, specifically whether the analysis upon which he based his Fair Use opinions were consistent with legal requirements.[2] Economics provides no insights as to whether Professor Jaffe's challenged opinions meet legal requirements, so I have nothing to say about the Motions in Limine directed at him.

It is my understanding that Rule 702 of the Federal Rules of Evidence permits expert testimony if "(b) the testimony is based on sufficient facts or data; (c) the testimony is the product of reliable principles and methods; and (d) the expert has reliably applied the principles and methods to the facts of the case."[3]

II.   Oracle's Challenge to Certain Leonard Opinions:

Oracle raises objections to several opinions of Dr. Leonard. These include:

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[1] "As indicated in prior orders, the Court requests Dr. Kearl's response to any *Daubert* motions regarding the parties' damages experts," excerpt from Order Clarifying Assignment of Rule 706 Expert, December 9, 2015, ¶ 7.

[2] Defendant Google Inc.'s Motion in Limine No. 4 to Exclude Market Harm Testimony from Expert Report of Dr. Adam Jaffe, March 23, 2016.

[3] Rule 702. Testimony by Expert Witnesses, Federal Rules of Evidence, amended December 1, 2014.

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1. Dr. Leonard's causation opinion should be excluded because it relies on Non-Infringing Alternatives (NIAs);[4]

2. Dr. Leonard's "bottom-up" apportionment opinions should be excluded because it relies on Non-Infringing Alternatives (NIAs);[5]

3. Dr. Leonard's "bottom-up" apportionment opinions should be excluded because the Kim model does not fit facts of the case;[6]

4. Dr. Leonard's "bottom-up" apportionment opinions should be excluded because the Kim model cannot be examined;[7]

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[4] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 4: "Dr. Leonard's Causation Opinion Relies on NIAs And Should Be Excluded," and "As discussed, the Court already determined that Google may not rely on such counterfactuals in its disgorgement analysis."

[5] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 5: "Dr. Leonard describes his bottom-up approach as measuring 'cost-savings for Google by allowing Google to avoid taking certain costly actions.' Under this approach, Dr. Leonard posits that, had Google not used Oracle's copyrighted work, Google would have successfully built Android anyway by implementing one of three NIAs, and thus should be liable only for the cost of the cheapest alternative: (1) 'licensing the allegedly infringing work under the OpenJDK'; (2) 'paying for developers to be trained in another programming language'; or (3) "paying for application development.' This avoided costs analysis is not even a measurement of profits to be disgorged. This is classic NIA analysis. Dr. Leonard opines that the amount of profits attributable to the infringement is the cost of the cheapest of those non-infringing alternatives, which he calculates as between $85,000 and $100 million. Dr. Leonard's opinions based on an NIA "cost-savings" approach should be excluded."

[6] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "Dr. Leonard's alternative bottom-up approach should be excluded for three additional and independent reasons. First, it relies on the Kim econometric model that does not 'fit' the facts of this case. Leonard uses the model to purport to estimate how Android profits would change if, in the non-infringing world in which Google did not use the infringing APIs, there were fewer Android apps available for consumers. However, the model relies on actual, real-world app statistics for infringing Android. In other words, the model itself relies on data that is tainted by the very infringement it seeks to remove from the damages analysis. It assumes the infringement away with one hand, and then sweeps it back in with the other. It is also a bad 'fit' because the model starts from the premise that Android was already a success, in that it relies on data from 2010-2011, when Android was already established in the market, instead of 2007-2009, the critical period when Android's fate was uncertain."

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5. Dr. Leonard should not use the Kim model to estimate Google revenue

    sharing agreements;[8]

6. Dr. Leonard's expense reductions should be excluded because they rely

    on Non-Infringing Alternatives (NIAs);[9]

7. Dr. Leonard's expense reduction should be excluded because it relies on

    unsupported diversion ratios;[10]

8. Dr. Leonard's top-down apportionment should be excluded because he

    did not assess the relative importance of the infringed APIs to the other

    lines of code;[11]

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[7] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "Second, the untested econometric Kim model cannot be examined. Dr. Leonard admitted in deposition that he was missing a crucial coefficient, *sigmaˆ*, that was not in Dr. Kim's paper, and that Dr. Leonard discovered the sigma value through emails between his staff and Dr. Kim." and "Dr. Kim's econometric model is a central 'fact' underlying Dr. Leonard's analysis, but she is in Korea and beyond the Court's subpoena power."

[8] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "Third, Google should not be permitted to hide behind an econometric model to estimate what Google paid other providers when Google knows that information and refused to produce documents critical to understanding those arrangements. Google revenue sharing agreements may reveal crucial terms that refute the Kim model, such as volume caps, volume escalators, or other terms affecting Google's revenue sharing."

[9] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 7: "Once again positing a speculative counterfactual (this time one in which Android does not exist), Dr. Leonard deducts ███████ from Google's Android revenues the money Google allegedly would have earned through advertising on non-Android mobile operating systems. This is another attempt to introduce NIAs into disgorgement; only the NIA this time is that Google did not build Android but instead partnered with Apple for Google's products and advertising to be on iPhones. This revenue-recapture method (dubbed an "opportunity cost") is irrelevant for the same reasons as the other NIA approaches: It has nothing to do with disgorgement under § 504(b)."

[10] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 7: "First, Dr. Leonard uses a 'diversion ratio' of 44% to calculate this recapture, but provides no basis for this figure."

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9. Dr. Leonard's TAC opinion should be excluded because he double

counted TAC.[12]

A. Challenges to the Use of Non-Infringing Alternatives

Oracle's objections 1, 2, and 6 above focus on Dr. Leonard's use of non-infringing alternatives. Whether using non-infringing alternatives is permissible in determining disgorgement damages is a legal, not economic, matter. Likewise, whether apportionment of the incremental contribution of the 37 Java APIs (including SSO and declaring code) to Android profits is a necessary and required element of a disgorgement analysis is also a legal matter. As such, economics has nothing to say about either issue.

Economics can contribute to an analysis of the incremental contribution of the 37 Java APIs to Android profits if apportionment is legally required. An economic approach to determining the incremental contribution of the 37 Java APIs would typically start by asking the degree to which Android profits would be lower if Google had not copied the 37 Java APIs into Android. Whether this is legally permissible is a matter for the court, but the approach would be consistent with standard economic and damages methodologies. As a matter of economics, it would be difficult to determine the contribution to profits of the copyrighted material used in a larger work if one could not ask what would be the profits of the larger work absent use of the copyrighted material.

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[11] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 8: "Both approaches value each and every line of code equally with no attempt to assess relative importance. Both approaches are unreliable and indefensible as a matter of law. Numerous courts, including the Ninth Circuit, have rejected apportionments that make across-the-board valuations without accounting for the relative significance of the work in question."

[12] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 10: "Dr. Leonard double-counts traffic acquisition costs ('TAC') when deducting expenses from Android revenues."

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Dr. Leonard goes a step beyond this in three of his challenged approaches in that he focuses on what would happen to Android profits if Google could have, or would have, done something specific in lieu of copying the 37 Java APIs.[13]   In two of these approaches, his analysis relies on specific mitigating actions that Dr. Leonard assumes were available to Google. Specifically, in addition to assuming that Google could have provided an applications platform in Android that used other APIs, Dr. Leonard assumes that Google could have undertaken actions to counteract the adverse effects of using other APIs. Whether this additional step is legally permissible is a matter for the court, but there is nothing in economics that requires this additional step in determining the share of Android profits that are attributable to the 37 Java APIs as Dr. Leonard's other approaches to apportionment demonstrate.

Oracle also challenges Dr. Leonard's causality analysis because Dr. Leonard appears to be of the opinion that causality cannot be determined without determining the size of an effect attributable to the 37 Java APIs, that is, without apportioning.[14] What specifically is required in a determination of causality is a legal matter for the court, but there is nothing in

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[13] The two mitigating actions are training app developers in the alternative programming language used by the non-infringing Android or subsidizing app development for a non-infringing Android. Expert Report of Gregory K. Leonard, corrected March 10, 2016, pp. 87-89: "Thus, a conservative measure of the cost-savings for Google from having to avoid training developers in another programming language such as C/C++ is $2,256,000" and "Assuming, quite conservatively, that Google would have had to pay for development of all these apps, the cost-savings to Google from the alleged infringement (and thus the unjust enrichment) would be between $23 million and $100 million, depending on the cost of app development." In the other non-infringing alternative considered by Dr. Leonard, Google uses the 37 Java APIs, but under an OpenJDK license. See Expert Report of Gregory K. Leonard, corrected March 10, 2016, pp. 85-87: "Moreover, I understand that Google could have taken and used just the SSO and declaring code for the 37 API packages from OpenJDK and combined this declaring code with Google's own implementation code. The incremental cost to Google of implementing the OpenJDK libraries would have been about one engineer's time for six months (or two engineers' time for three months)…the incremental cost would be $84,722."

[14] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 4: "Dr. Leonard explicitly bases his disgorgement causation opinion on NIAs. In assessing whether a causal nexus exists between Google's use of the 37 Java API packages and Google's profits, Dr. Leonard declares it necessary to analyze 'Google's best course of action had it not used the allegedly infringing material.'"

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economics that implies or requires that causality be determined by the direction <u>and</u> size of a change as opposed to only the direction of a change. That is, A could cause a small effect on B or a large effect on B; alternatively, A could be a sole cause of an effect on B or one of several or many causes of an effect on B. In any of these cases, from an economic perspective A "causes" an effect. From an economic perspective, the size of the effect (in contrast to whether there is an effect or what is the direction of the effect) is the apportioned contribution of A to B.

B. Challenges to the Use of the Kim Model

Oracle's objections 3, 4 and 5 above focus on Dr. Leonard's use of the Kim model. The Kim model is estimated based on consumer choices among alternatives.[15] The alternatives considered are those available to consumers, not Google: it is Android phone users who can choose to do something different if their phones are less valuable because they have fewer (or no) Java-based apps. In the Kim model, consumers can choose to substitute a non-Android phone or simply reduce their demand for phones when Android phones are less attractive. The effect on consumers of either a reduction in the value of Android or in Android's market share would generally be a necessary starting point for an economic apportionment analysis of, for example, the contribution of apps to Android's profits. In relying on the Kim model to estimate but-for profits, Dr. Leonard is implicitly assuming (and asserting that it is Oracle's claim) that Google would have provided an applications platform in Android that did not use the 37 Java APIs and that doing so would have reduced the apps available to con-

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[15] Expert Report of Gregory K. Leonard, corrected March 10, 2016, ¶ 186: "I have applied the Kim (2013) empirical model of smartphone demand conservatively to estimate the decrease in Android handset sales that would have occurred in a counterfactual where there were fewer Android apps, as well as the percentage of this Android sales decrease that would have been captured by the iPhone. Google would earn ad revenue on these additional iPhone units."

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sumers.[16] If this starting point is legally impermissible in the apportionment part of a dis-gorgement analysis, then Dr. Leonard's reliance on the Kim model is impermissible.

Oracle challenges Dr. Leonard's reliance on the Kim econometric model[17] because the Kim model relies on actual real-world app availability to estimate the demand for Android, while Dr. Leonard uses the Kim model to estimate how the demand for Android would change if fewer Android apps were available.[18] I do not believe that Oracle's critique is economically correct. Econometric models rely on current and historical data to estimate the "all else equal" relations between attributes and an outcome. Once estimated, they are routinely used to estimate the size of the change in the outcome when only one attribute (of perhaps many) changes. The Kim model is consistent with standard and widely used econometric methods.

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[16] Expert Report of Gregory K. Leonard, corrected March 10, 2016, ¶ 185: "As discussed above, the alleged infringement generated cost-savings for Google by allowing Google to avoid taking certain costly actions. If Google did not take such actions and did not allegedly infringe, Oracle's claim is that there would have been fewer Android apps and this would have impacted Android device sales and therefore the Android-related profits," and ¶ 211: "[I]n the but-for world, contrary to Mr. Malackowski's assumptions, Android still would have existed. Google could have chosen to use one of many other existing application programming languages and still achieved essentially the same level of success with Android as it did in the actual world using Java as the applications programming language."

[17] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "Leonard uses the model to purport to estimate how Android profits would change if, in the non-infringing world in which Google did not use the infringing APIs, there were fewer Android apps available for consumers. However, the model relies on actual, real-world app statistics for infringing Android. In other words, the model itself relies on data that is tainted by the very infringement it seeks to remove from the damages analysis. It assumes the infringement away with one hand, and then sweeps it back in with the other. It is also a bad 'fit' because the model starts from the premise that Android was already a success, in that it relies on data from 2010-2011, when Android was already established in the market, instead of 2007-2009, the critical period when Android's fate was uncertain."

[18] Expert Report of Gregory K. Leonard, corrected March 10, 2016, ¶ 23: "On its face, Mr. Malackowski's causal nexus argument is incorrect because it ignores the fact that, if there had been no Android at all, or if Android had been less attractive to developers resulting in fewer apps being available, the individuals who used Android devices in the real world would have turned in the but-for world to other mobile platforms, for example iOS, in large numbers and Google would earn revenues and profits on ads served to those users' devices."

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Likewise, the use of an econometric model to predict the effect of a counterfactual change in an attribute is standard and widely used methodology.

Oracle further objects to Dr. Leonard's use of the Kim model because the Kim model is based on data from 2010-2011, when Android was already a success, while the critical period is 2007-2008 when Android's fate was uncertain.[19] This would appear to be a factual dispute in the following sense: The Kim model estimates the effect of a change in available apps on Android's market share. Oracle appears to be arguing that the size of this effect would be larger, perhaps substantially so, during the critical startup period than when Android was a market success so that, at best, the estimated effect in the Kim model is a lower bound on the actual effect. As a methodological matter, economists often use estimated parameters from econometric models for analysis outside of the date range for the data used to estimate the parameters, but they do so with caution and, often, with evidence that supports the stability of the parameter estimates between different date ranges or that allows for adjustment of parameter estimates for different date ranges. Dr. Leonard does not appear to have investigated the stability of the Kim parameter estimates across time and he provides no evidence suggesting that the response of consumers would be similar in the earlier period to what Dr. Kim estimated it to be in the latter period. Economics provides no insight as to whether this renders his use of the Kim model unduly speculative or unreliable.

However, I believe that the Kim model is useful in understanding how demand for Android may have changed had fewer apps been available for Android, and in my report, I use a modification of the Leonard implementation of the Kim model (but I do *not* modify the

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[19] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "It is also a bad 'fit' because the model starts from the premise that Android was already a success, in that it relies on data from 2010-2011, when Android was already established in the market, instead of 2007-2009, the critical period when Android's fate was uncertain."

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parameter estimates with respect to time).[20] I do so recognizing that the Kim model may underestimate the reduction in Android market share from a reduced number of available apps in the 2007-2008 time period.

Also with regard to Oracle Objection 3, I expressed reservations in my report about Dr. Leonard's use of the Kim model because it focuses on changes in a relatively small number of most-often downloaded apps.[21] Dr. Leonard's use of the Kim model implies that he is of the opinion that a relatively small number of most-often downloaded apps is the relevant focus of this case. This would appear to be a factual dispute about the usefulness of the Kim model in this matter and not about the Kim model per se.

With regard to Oracle Objection 4, I have expressed concerns about the inability of anyone, including Dr. Leonard, to test Dr. Kim's parameter estimates, model specification, or the validity and reliability of her constructed data set.[22] This criticism doesn't go to the reliability of the methodology at a general level, which as noted earlier, is widely accepted in economics and damages analyses, but it may go the reliability of the implementation of the methodology by Dr. Kim. Whether Dr. Leonard's reliance on an econometric model that he did not estimate and that neither he nor any other expert in this case can test is at the Daub-

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[20] Expert Report of Professor James R. Kearl, corrected March 21, 2016, Exhibits 4, 5a and 5b.

[21] Expert Report of Professor James R. Kearl, corrected March 21, 2016, ¶ 65: "Putting aside the non-technical critiques by Mr. Malackowski and Professor Jaffe of Dr. Leonard's analysis, I believe that a limitation on the results of Dr. Leonard's analysis is that it focuses on the availability of Top 100 apps and the effect on Android sales." Mr. Malackowski expressed the same concern in his Responsive Expert Report of James E. Malackowski, February 29, 2016 (Corrected), ¶ 162: "Finally, Dr. Leonard's analysis ignores that Android would need hundreds of thousands of apps available to be attractive to developers and consumers. By limiting his analysis to Java-enabled apps in the top 100, he fails to value the hundreds of thousands of other Java-enabled apps available on Google Play."

[22] Expert Report of Professor James R. Kearl, corrected March 21, 2016, fn. 99: "…I am unable to address certain facets of Dr. Leonard's work because the data used to estimate the Kim model are not available to test. For example, I have not been able to test whether the coefficients relied upon by Dr. Leonard might vary over time."

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ert threshold is a matter for the court. However, economists often rely on parameter estimates from published econometric work that they do not, themselves, estimate.

Finally, Oracle objects to Dr. Leonard using the Kim model to estimate what Google paid other providers when Google knows that information.[23] I do not understand Oracle's objection here, and do not see where Dr. Leonard uses the Kim model (or any econometric model) to estimate Google revenue sharing agreement terms. I also do not see how the Google revenue sharing agreement terms – such as volume caps and volume escalators – relate to the Kim model.

C. Challenges to the Leonard Expense Reduction

Oracle argues that Dr. Leonard's "revenue recapture"[24] expense reduction should be excluded because (in addition to relying on non-infringing alternatives) this reduction relies on "diversion ratios" that are unexplained.[25] These diversion ratios are properly derived from the

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[23] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 6: "Third, Google should not be permitted to hide behind an econometric model to estimate what Google paid other providers when Google knows that information and refused to produce documents critical to understanding those arrangements. … Google revenue sharing agreements may reveal crucial terms that refute the Kim model, such as volume caps volume escalators, or other terms affecting Google's revenue sharing."

[24] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 7: "Once again positing a speculative counterfactual (this time one in which Android does not exist), Dr. Leonard deducts ███████ from Google's Android revenues the money Google allegedly would have earned through advertising on non-Android mobile operating systems. This is another attempt to introduce NIAs into disgorgement; only the NIA this time is that Google did not build Android but instead partnered with Apple for Google's products and advertising to be on iPhones. This revenue-recapture method (dubbed an "opportunity cost") is irrelevant for the same reasons as the other NIA approaches: It has nothing to do with disgorgement under § 504(b)."

[25] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 7: "This revenue recapture method should be excluded for additional and independent reasons. First, Dr. Leonard uses a 'diversion ratio' of 44% to calculate this recapture, but provides no basis for this figure. Dr. Leonard's notes in his Exhibit 1b refer to Exhibit 3d2 for more on the ratio, but Exhibit 3d2 contains the same percentage without further explanation."

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Kim model, and using the back-up materials that Dr. Leonard provided I was able to replicate these numbers.[26] The footnoting of the source and calculation of Dr. Leonard's diversion ratios in his report tables is not ideal, as is sometimes the case when reports are prepared under deadlines. However, I was able to replicate the calculation and ascertain the source of Dr. Leonard's diversion ratios.

D. Challenges to the Leonard Top-Down Apportionment

Oracle challenges Dr. Leonard's line-counting approach to apportionment.[27] Dr. Leonard assumes that the lines of code implementing the 37 Java APIs are no more valuable than any other lines of code.[28] From an economic perspective, however, the value of these lines of code depends not on their relative size, but upon what they contribute to Android and,

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[26] Expert Report of Professor James R. Kearl, corrected March 21, 2016, fn. 99: "As a result, I have provided various sensitivity tests to Dr. Leonard's calculation of alternative market shares and diversion ratios…" and Exhibits 4c.3, 4c.4, 4d.3, and 4d.4. See also Expert Report of Professor James R. Kearl, corrected March 21, 2016, ¶ 95: "The diversion ratios used by Dr. Leonard are derived from his application of the Kim model. As discussed above, I have some concerns regarding Dr. Leonard's application of the Kim model in determining the But-For market share of Android, if Android did not contain the 37 Java APIs and thus had fewer available applications. However, most of these concerns relate to the specified But-For number of apps available on a non-infringing Android, and the diversion ratios that result from the Kim model do not appear sensitive to this concern. Thus, of the two Leonard lost profits models, I would put more weight on the results of his diversion ratio model."

[27] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 8: "In one iteration, Dr. Leonard takes the total number of lines of code Google copied (12,774), divides by the total number of lines in Android (1.53 million), and multiplies that percentage by what Dr. Leonard claims are Android's profits. In another iteration, Dr. Leonard uses as the denominator the number of lines of code in Android (1.53 million) plus those in Google's primary search code base (1.7 million) plus those in Google's primary ads code bases (48.5 million) and multiplies that percentage by what Dr. Leonard claims are Android's profits. Both approaches value each and every line of code equally with no attempt to assess relative importance. Both approaches are unreliable and indefensible as a matter of law."

[28] Expert Report of Gregory K. Leonard, corrected March 10, 2016, ¶ 199: "Given the lack of evidence that the 37 API packages at issue are unique or reflect a special level of programming ingenuity, a reasonable approach to the apportionment between the 37 API packages and the rest of Android can be based on programming effort, which in turn can be measured by lines of code or number of methods coded."

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specifically, to Android's profits. Dr. Leonard's assumption in this regard cannot be derived from or based on economics, but is his non-economics-based opinion about a central factual dispute in this case: did the (coded) 37 Java APIs contribute anything to Android's profits? He has assumed the answer, rather than relying on economic principles or methodologies to demonstrate the answer or rather than setting forth economic principles or methodologies that could assist the jury in determining an estimate of the apportioned profits if it were to de-termine that these lines of code were more valuable than other lines of code.

E. Challenges to the Leonard TAC Expense Estimate

Oracle challenges Dr. Leonard's estimate of Google TAC in the period after 2011 when Google no longer tracked Android TAC as a separate line item on the Android Profit and Loss statements.[29] Whether Android TAC is or is not included in certain Android cost lines in the years after Google stopped separately reporting it is a factual matter. Whether Google met its burden to prove its costs because it did not provide accounting records or oth-er documents supporting Dr. Leonard's assumptions with regard to where these costs are located when he made his Android TAC adjustments is a legal matter. However, if Google has met its burden of proof with regard to costs, and if the disputed Android cost lines do not contain Android TAC, then Dr. Leonard's approach to estimating Android TAC in years when Google didn't separately report it is consistent with the approach taken in analogous situa-tions by damages experts. The reliability of Dr. Leonard's actual adjustment depends upon assumptions he makes regarding empirical relationships of various lines in accounting rec-

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[29] Oracle's Motion in Limine #4 Regarding Google's Damages Expert, Dr. Gregory Leonard, p. 10: "Dr. Leonard double-counts traffic acquisition costs ("TAC") when deducting expenses from Android revenues. TAC is the portion of ad revenue that Google pays to its partners (e.g., Apple, Samsung, Verizon) in exchange for setting Google as the default search engine. During this suit, sometime in 2011 and without explanation, Google stopped reporting Android ad revenue on its Android profit and loss ("P&L") statements. While Google stopped reporting ad revenue on its Android P&L, it apparently kept some of the costs (TAC), just in a different category. Therefore, when Dr. Leonard deducts TAC in the amount of ███████, he is doing it twice because TAC (without the revenue) is already on the P&L."

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ords, however. Whether these assumptions are consistent with record evidence may be disputed, but analogous assumptions are common in damages analyses.

III.   Google's Challenge to Certain Malackowski Opinions

Google raises objections to several opinions of Mr. Malackowski. These include:

1. Mr. Malackowski's causal nexus opinion regarding Google's indirect advertising revenues should be excluded because he fails to causally connect the use of the 37 Java APIs to Android users search efforts;[30]

2. Mr. Malackowski's opinion on apportionment (or lack thereof) should be excluded because it is contrary to legal authority;[31]

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[30] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, pp. 1-2: "First, Malackowski fails to conduct any meaningful analysis supporting his claim that the alleged infringement of Declarations/SSO of the Java SE APIs caused Google to earn ███████ in advertising revenue. The first step in a disgorgement analysis under copyright law is the plaintiff's obligation to establish a causal nexus between the alleged infringement and the defendant's revenue. But Malackowski never even analyzes the causal aspect of the supposed nexus, much less establishes one. He simply notes that Google has earned ███████ from advertisements served on Android devices, which happen to contain the Declarations/SSO of the Java SE APIs. By itself, that is inadequate as a matter of law, and renders his opinion inadmissible."

[31] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, p. 2: "[O]nce he deducts Google's costs to reach a profit number, Malackowski conducts no apportionment of Android at all. He opines that the Android OS as a whole—including the more than 99% of Android code that is not accused in this case—is responsible for ███ of profits on advertisements shown on Android devices and 100% of profits on Google-branded Android hardware, applications and digital content sold for use on Android devices. He admits that the resulting $8.8 billion in profits was earned by the entire Android platform, and that all the myriad other elements of the platform contributed toward that profit. But he glibly says it doesn't matter. Citing no law in his report, he falls back on 'the legal theory of commingling,' arguing that where an infringer 'has mixed the infringing and noninfringing attributes in a way that makes it difficult or impossible to separate out the respective contributions of each to overall profits,' Oracle is entitled to every single penny of indirect profits earned by the Android platform. This makes no sense, because if there was no commingling of infringing and noninfringing attributes in an accused product, there would be no need to apportion anything. Unsurprisingly, his approach contradicts the mandate of 17 U.S.C. § 504(b) and controlling authority interpreting it."

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3. Mr. Malackowski's lost profits opinion should be excluded because it is unduly speculative;[32]

4. Mr. Malackowski's opinion regarding Oracle's lost profits from a Java based mobile operating system should be excluded because it is speculative.[33]

A. Challenges to the Malackowski Causal Nexus Opinions

Google objects that Mr. Malackowski has not met the legal requirements to show causal nexus between the use of the 37 Java APIs in Android, and the search ad revenue that Google earns from ads viewed by users of Android devices. [34] What are the legal requirements for showing causal nexus is not an economic matter on which I can provide any insight.

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[32] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, p. 3: "Here, Malackowski bases his analysis on a single 2008 Sun document projecting revenues for licensing Java ME—a different Java platform from Java SE, and not even the accused work here— through 2010 only, with an 8.3% increase from 2009 to 2010. Malackowski takes this lone forecast and, relying on a private conversation with former Sun (and now Oracle) employee Michael Ringhofer, assumes that Oracle would have increased its Java ME revenues 8.3% year over year through 2015 but for the presence of Android. Despite having customer-specific data on Java ME licensing, he does not tie the loss of any specific Java ME business to Android."

[33] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, p. 3: "Fourth, Malackowski admittedly speculates that, had Google not allegedly infringed, Oracle would have created its own full-stack mobile platform—something it never came close to doing despite trying for years—and made just as much profit as Google has made indirectly from Android using an entirely different business model than Oracle's business model."

[34] Expert Report of Gregory K. Leonard, corrected March 10, 2016, p. 8: "Oracle's expert Mr. Malackowski's causal nexus analysis is fundamentally flawed because (1) he fails to consider the economically appropriate counterfactual, i.e., the one in which Google pursued its best noninfringing course of action, (2) he fails to acknowledge that most of the revenues he points to are only indirectly related to Android, and (3) he does not consider the large number of factors other than the alleged infringement that contributed to Android's success and thus fails to show a causal nexus or link between the revenues and the alleged infringement."

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As a matter of economics, if the purpose of a causal nexus determination is to establish that Google benefitted from Android even though Android was made available to interested users without cost, these benefits could accrue to Google through some combination of increased search ad revenues or decreased search ad-related costs. It appears that an advantage of Android is that traffic acquisition costs – an important component of search ad-related costs – are lower for search ads on Android mobile devices than on non-Android mobile devices, and that aggregate ad revenues from search ads on mobile devices are no lower. If this is factually true, as an economic matter Google benefits from Android because it has higher profits on mobile-device search ads than it would if all mobile search-ad revenues were generated by non-Android devices. That Google's search ad *net* revenues (net of traffic acquisition costs) are higher because Android has been successful seems beyond much dispute. Therefore, if affecting *net* Android search ad revenues meets the causal nexus test as a matter of law, Mr. Malackowski would only need to establish that the 37 Java APIs contributed to Android's market success. Mr. Malackowski relies on a narrative for this purpose that is mostly based on selected "facts," but it also relies on economic theories put forward by Professor Jaffe.[35] I do not believe that the economic theories advanced by Professor Jaffe are essential to Mr. Malackowski's narrative. Whether the selected "facts" put forward by Mr.

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[35] Responsive Expert Report of James E. Malackowski February 29, 2016, ¶18: "My opinion is also consistent with the overall business circumstances. As previously described, Google faced an extremely competitive landscape with a very limited window of opportunity, and had to obtain the cooperation of numerous other business actors in order to make a successful launch of the Android Platform. Those business actors were familiar with (and comfortable with) Java in mobile phones. Java represented a significant portion of the market at the time, and Google overtly capitalized upon that familiarity and comfort with the very important audience of carriers and OEMs. Furthermore, the technical expert evidence also shows that Android and its most important applications are dependent upon the Java APIs, that the Java APIs provided stability to the Android Platform during the critical launch period, and that the Java APIs are centrally important to the Android Platform," and ¶ 26: "In addition, the platform economics as described by Dr. Jaffe further underscores the great significance of the business circumstances faced by Google in 2006 when it made the 'final' decision to build a Java-based system, as set out in my Initial Report. As explained by Dr. Jaffe, multi-sided platform markets like this one are very limited in their opportunities for success and depend upon critical gating actors who are beyond the control of the platform provider."

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Malackowski are sufficient to show the 37 Java APIs contributed to the market success of

Android is a matter for the court and/or the jury.

B. Challenges to the Malackowski Apportionment Opinions

According to Google, Mr. Malackowski claims that the legal theory of commingling

permits Oracle to claim in its disgorgement damages total 100% of the value of all of An-

droid.[36] Google objects that this claim is contrary to the law, and that it is clear that much of

the value of Android is attributable to elements of Android other than the 37 Java APIs.[37]

What are the legal requirements for apportionment is not an economic matter on which I can

add insight.

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[36] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and
Testimony of James Malackowski, March 23, 2016, p. 2: "[Malackowski] opines that
the Android OS as a whole—including the more than 99% of Android code that is not
accused in this case—is responsible for ████ of profits on advertisements shown on
Android devices and 100% of profits on Google-branded Android hardware,
applications and digital content sold for use on Android devices. He admits that the
resulting $8.8 billion in profits was earned by the entire Android platform, and that all
the myriad other elements of the platform contributed toward that profit. But he glibly
says it doesn't matter. Citing no law in his report, he falls back on 'the legal theory of
commingling,' arguing that where an infringer 'has mixed the infringing and
noninfringing attributes in a way that makes it difficult or impossible to separate out
the respective contributions of each to overall profits,' Oracle is entitled to every
single penny of indirect profits earned by the Android platform."

[37] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and
Testimony of James Malackowski, March 23, 2016, p. 2: "This makes no sense,
because if there was no commingling of infringing and noninfringing attributes in an
accused product, there would be no need to apportion anything. Unsurprisingly, his
approach contradicts the mandate of 17 U.S.C. § 504(b) and controlling authority
interpreting it." See also Expert Report of Gregory K. Leonard, corrected March 10,
2016, ¶ 22: "In addition, given that the advertising revenues associated indirectly with
Android were the result of many factors having nothing to do with the alleged
infringement, such as Google's investments in its search and advertising
technologies and services, other functionalities of Android, the investments of device
manufacturers in providing high quality Android devices, etc., and given that these
advertising revenues would have been captured by Google at least to some extent
through other channels (such as iPhone and personal computers) even if Android did
not exist at all (which, as will be explained below, is not the correct counterfactual in
the event Google did not use the allegedly infringing material), further doubts exist
regarding the presence of any causal nexus between the advertising revenues and
the alleged infringement."

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Mr. Malackowski does opine that no further apportionment of Android revenue to the 37 Java APIs is possible (in addition to not being required).[38] This is an economic opinion, and he provides no methodology, implicit or explicit, or evidence of the type on which a damages expert would rely in support of this opinion. As discussed in my Expert Report, I believe that such an apportionment is possible, and involves comparing actual (with infringement) profits to the profits Google would have made without infringement (but-for profits).[39]

C. Challenges to the Malackowski Java ME Lost Profits Opinions

Google challenges Mr. Malackowski's lost profits analysis on, essentially, a causality argument as well as an argument about whether the change in licensing revenue of Java ME between only two years, 2009 and 2010, can be used as the growth rate to estimate licensing

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[38] Responsive Expert Report of James E. Malackowski, February 29, 2016 (Corrected), ¶ 272: "As discussed previously, my apportionment analysis is consistent with the application of the legal theory of commingling and is therefore based on 100% of the value of the Platform Contribution," and ¶ 285: "When it comes to the Platform, however, I have not further subdivided the value between the Infringed Java Copyrights and the Google contribution. As the technical analysis of Dr. Schmidt reveals, Google appears to have contributed only 26 percent of the code to the Platform and borrowed the remainder. On the other hand, Sun and Oracle unwillingly contributed code that turned out to be of vital importance to the Android Platform. This is where Google's commingling makes it extremely difficult to separate out the items of value. And, this is also where I have applied my judgment as an expert in light of the business circumstances that Google faced at the time to determine that the Java APIs were a gating item to the successful launch of the Android platform. In light of that significance, it is in my opinion appropriate to credit the Infringed Java Copyrights with the entire value of the Platform Contribution."

[39] Expert Report of Professor James R. Kearl, corrected March 21, 2016, ¶ 35: "I do not have a position on the legal issue of whether non-infringing alternatives can be considered in a disgorgement analysis, and if so, which alternatives are allowed to be considered. However, as an economist it seems sensible to allow (indeed, to require) consideration of the next best non-infringing alternative. If the measure of disgorgement damages is the profits attributable to the infringement, then this naturally seems to call for an apportionment of the total profits of the infringing product between those that are due to the infringement and those that are due to other factors. And this apportionment seems to naturally call for a But-For analysis and a specification of a noninfringing alternative."

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revenue between 2009 and 2015.[40] With regard to the causality, Mr. Malackowski is obscure

about the relationship between Android and Java ME.[41] In the first phase of this case, the

matter was more clearly put: Java ME, as an applications programming platform, is a com-

plement to non-Apple and non-Microsoft mobile device operating systems. Therefore, a Java-

based applications programming element in an infringing Android mobile device substitutes

for a Java ME license when a potential user chooses Android rather than a non-Apple/non-

Microsoft device where Java ME may be licensed. In this way, the success of Android likely

reduced Java ME licensing revenue. If this isn't Mr. Malackowski's causality theory, then I

agree with Google that estimating lost profits for Java ME because of the infringement of Ja-

va SE copyrights makes little economic sense.[42]

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[40] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, p. 3: "Here, Malackowski bases his analysis on a single 2008 Sun document projecting revenues for licensing Java ME—a different Java platform from Java SE, and not even the accused work here—through 2010 only, with an 8.3% increase from 2009 to 2010. Malackowski takes this lone forecast and, relying on a private conversation with former Sun (and now Oracle) employee Michael Ringhofer, assumes that Oracle would have increased its Java ME revenues 8.3% year over year through 2015 but for the presence of Android. Despite having customer-specific data on Java ME licensing, he does not tie the loss of any specific Java ME business to Android," and p. 3: "Fourth, Malackowski admittedly speculates that, had Google not allegedly infringed, Oracle would have created its own full-stack mobile platform—something it never came close to doing despite trying for years—and made just as much profit as Google has made indirectly from Android using an entirely different business model than Oracle's business model."

[41] Responsive Expert Report of James E. Malackowski, February 29, 2016 (Corrected), ¶ 174: "However, Android does not have a static relationship with Java ME whereby a unit of Android on the market causes a specific level of Java ME lost profits. Sun lost entire business relationships, it lost the opportunity to compete in the smartphone space, and it lost the ability to significantly monetize Java through its historic licensing model."

[42] Expert Report of Gregory K. Leonard, corrected March 10, 2016, ¶ 282: "Moreover, as discussed already, the accused copyrighted works in this case are the SSO and declaring code for 37 API packages from the Java SE platform, not anything from Java ME. … To the extent Oracle is contending that Sun's Java ME licensing business was harmed by Google's use of a small fraction of the technology contained in the Java SE platform, that harm likely would have occurred anyway as a consequence of Sun's decision, before Android's release, to open source the entire Java SE platform, and cannot be attributed to Android."

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Forecasting but-for revenues or sales or units based on contemporary business fore-casts is a standard method for deriving a lost profits estimate. What is not standard is to line-arly extrapolate those contemporaneous forecasts far outside the range of those actual fore-casts with no additional analysis or support. Attention also has to be paid to events unrelated to Android that could have affected actual revenues (e.g., the 2008 recession). Mr. Malackowski made no adjustments to actual revenues.[43] Mr. Malackowski doesn't discount his forecasts for the uncertainty associated with the forecast itself, which is substantial when a one-year change in revenues is assumed to be the growth rate over five or six years, and he doesn't discount or make adjustments for the business risks or a changing economic envi-ronment over the forecast period.[44] This would be methodologically unusual. Whether it ren-ders his estimated lost profits unduly speculative is a matter for the court.

D.   Challenges to the Malackowski Lost Profits Opinions Regarding a Java-Based Mobile Operating System

Google objects to Mr. Malackowski's opinion that Android had a negative impact on Sun's ability to develop a Java-based mobile operating system (e.g., SavaJe/Arcadia), and that this impact is potentially best measured by the apportioned Android profits.[45] The Google
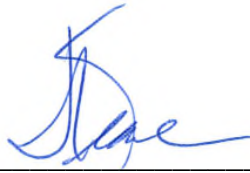
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[43] Responsive Expert Report of James E. Malackowski, February 29, 2016 (Corrected), ¶ 194: "While the financial crisis significantly impacted the economy, consumers' growing use of mobile data on increasingly complex mobile devices set the stage for the mobile industry, and Sun's related business, to minimize the impact of the recession."

[44] Responsive Expert Report of James E. Malackowski, February 29, 2016 (Corrected), Exhibit 12.3, applying the 8.3% growth rate across years 2010-2015.

[45] Defendant Google Inc.'s Motion in Limine No. 6 to Exclude Portions of Expert Report and Testimony of James Malackowski, March 23, 2016, p. 7: "[A]lthough Malackowski is unable to quantify Oracle's lost profits resulting from its inability to launch its own mobile operating system (called Project Acadia or SavaJe), Malackowski speculates that Oracle's lost profits would best be measured by Google's profits from using the allegedly infringing Declarations/SSO of the 37 Java SE APIs in the Android operating system. Yet Malackowski admittedly did no analysis to support this opinion. Again, highlighting the speculative nature of Malackowski's opinion, Oracle's expert Dr. Jaffe testified that he could not opine whether SavaJe could have been successful in the absence of Android."

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objection is that the opinion is speculative and unsupported. Mr. Malackowski provides no

analytical or evidentiary support linking Android profits, apportioned or not, to Sun's or Ora-

cle's failure to develop a Java-based "full stack" operating system.[46]

Respectfully submitted this 6th day of April, 2016

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J.R. Kearl

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[46] Expert Report of James E. Malackowski, January 8, 2016 (Corrected), ¶¶ 216-217: "Had
Google been delayed for a significant period in its entry to market by having to
develop its own APIs rather than using the 37 Java APIs from the Java Copyrights, it
is possible that Acadia could have captured the Java-based smartphone field.
…Therefore, I believe Sun and later Oracle's actual losses attributable to the lost
Acadia opportunity could be quite significant, and, potentially best measured by the
apportioned Android profits attributable to the Infringed Java Copyrights. In other
words, Google's Android-related profits represent, in some part, Sun and Oracle's
inability to pursue the exact same market opportunity for a Linux/Java SE based
smartphone because Google was competing against them using their own Java
Copyrights."